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HUNTER XD

User Manual

Manufactured by

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1. Introduction

1.1 The Shearwater TSCM Hunter XD is an equipment designed to detect, locate, and identify Radio transmitters used for surreptitious surveillance. Hunter XD is designed to detect virtually all known, or theoretically possible, Radio device attacks, with an ease of use previously impossible.

1.2 Hunter XD is capable of extremely high degrees of effectiveness when used by seasoned professionals, or by casual staff after a few hours of training.

2. System Description

2.1 Hunter XD is a Differential Field Gradient Radio Microphone Detector. The system works by detecting the rapidly changing Electromagnetic field created by an adjacent Radio device, while rejecting the strong but essentially constant Electromagnetic fields due to distant but powerful broadcast transmitters.

2.2 The system has the following parts:

1 x Search Head
1 x Signal Processor/ Extendable boom assembly
1 x Headset
2 x Lithium Ion Batteries
1 x Battery Charger
1 x Test Source
1 x User Manual
1 x Transit Case

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3. System Capabilities

3.1 Hunter XD is designed to be effective against virtually all known or possible types of Radio device. The system is unique in that while capable of detecting the most sophisticated types of attack, Hunter XD can be used effectively by an average person after rudimentary instruction. The following types of device are detectable by Hunter XD, together with the sounds expected in the headset:

Radio Microphone Type	Notes	Expected Audio from Headset
Frequency Modulated (F.M.)	Simplest and most common type	Room noises, same as the microphone detects
Amplitude Modulated (A.M.)	Little used because F.M. offers better quality	Room noises, same as the microphone detects
Double Modulated (Sub-Carrier)	In common use for 25 years	Silence. Headset will go quiet. Tapping the suspected Radio microphone may cause corresponding sounds in the Hunter XD headset.
Double Modulated/Noise masking	Similar to Double Modulated, but with masking added to make the detected quiet carrier less notable	May hiss, may hum, or may sound like anything, but only at one location in the room. Tapping suspected microphone may cause corresponding sounds in headset.
Delta Modulated, including CVSD.	Simplest approach to digital communication	Sounds like noise, but containing the cadence of room noises.
PCM (Pulse Coded Modulation), including ADPCM	More sophisticated digital communication	Often sounds like noise. Often contains the cadence of room noises, but not always. Sometimes silent.
Noise Modulated (DSSS)	Spread Spectrum	White Noise, no cadence.
FM Frequency Hopper	Spread Spectrum	Room Noises
Digital Hopper	Spread Spectrum	Sounds like noise, but containing the cadence of room noises.
Inverted Speech FM, Time Domain Interleaving, including split band inversion	Elementary method of "Scrambling" speech to conceal the true nature of the signal. Quite popular.	The cadence of room noises will be heard. Tapping the suspected microphone will cause very marked sounds.
Digitally Encrypted	High security transmission. Available, but not common.	Noise will be heard, no cadence

Burst Mode	Signals stored in Radio Microphone memory and transmitted in rapid bursts. Not in common use.	Rapid deflection of metering, occurring occasionally. Pulses heard in headset. Very hard to locate dependant of how often the bursts a transmitted.
Single Side Band (SSB)	Not common because of difficulties in achieving good sound quality	Signal is only present when noise is present in Target location. Tapping suspected microphone will cause cadence to be detected in the headset
Data Attacks	Not all Radio eavesdroppers use microphones - video or computer data is just as valuable	Bursts of data corresponding to the operation of data Processing equipment should be suspect. Note that most electronic equipment radiates to some degree, so care in identification is necessary.
Others	?	As technology evolves, so does the eavesdropper. Be suspicious of any localised high strength Hunter XD meter indication, irrespective of what it sounds like.

*Cadence This is the property whereby when the Radio Microphone detects a sound, the transmission from the microphone does not contain the sound in a form which is identifiable as the sound, but is still notable as a change in the transmission which is correlated to sounds in the search location. A example would be a hand clap which sounds on a CVSD transmission as a burst of noise. The noise is not recognisable as a clap but instantly recognisable as a change in transmission caused by the clap.

4. Theory of Operation

4.1 The Hunter XD is intended to be used both by Technical Security professionals during Technical Security Inspections, and by General Security or office staff, supplementing physical searches. This is possible because unlike most effective Technical Countermeasures equipment, Hunter XD is easy to use, positive in operation, and it does not require years of skill and technical ability to interpret the results.

4.2 Hunter XD is a Differential Field Gradient Radio Microphone detector. The Differential Field Gradient method of Radio Microphone detection works on the principle that the Radio signals from relatively distant sources generate a fairly constant Radio frequency field strength, while the signal from a very close transmitter (Radio microphone) shows a very marked change in field strength close to the device.

4.2 The search Head of Hunter XD contains two balanced ultra wide band detectors positioned side by side. The Hunter XD functions by comparing the outputs from the two detectors on the Search Head. When the Search Head is detecting only innocent broadcast transmissions from distance sources, the output from each of the two Search Head detectors is equal, and Hunter XD will give little or zero meter indication. When the Search Head is moved over a Radio Microphone, the Hunter XD metering detects the imbalance providing indication on the display metering, usually a full scale deflection.

4.3 Hunter XD is equipped with a Centre Zero AMOLED display. Full scale deflections left and right correspond to the movement of the head over the object generating the high local field (Radio device). When the field is stronger to the left of the search head, meter deflection is to the left.

4.4 Hunter XD is equipped with an audio demodulation system enabling the nature of the transmission detected to be ascertained.

4.5 Hunter XD looks like a metal detector, and is used the same way. The system search head is a lightweight antenna system which is connected by a shaft to the signal processor.

4.5 The user connects the search head to the signal processor shaft, plugs in the headset, switches on and commences use. The differential detection system means that typically no activity is noted on the LED meter until a severe R.F. field imbalance is noted. Power conduits and metal window frames will typically cause a small indication, an adjacent Radio device will cause a large indication, typically full scale deflection, swinging from right to left as the search head is moved over the Radio Microphone. The recovered audio in the user headset clearly indicates if the signal causing the R.F. field disturbance is Broadcast Television, Broadcast A.M. or F.M., or something more sinister.

4.6 The Hunter XD will find virtually all Radio devices, irrespective of sophistication. Not all Radio device signals can be demodulated by Hunter XD, as modern technology allows digital encryption which effectively masks the nature of the signal to all except those with the appropriate decryption "Key". Hunter XD will easily find and identify even the most sophisticated encryption technique by the simple fact that the signal is there, emanating from one spot.

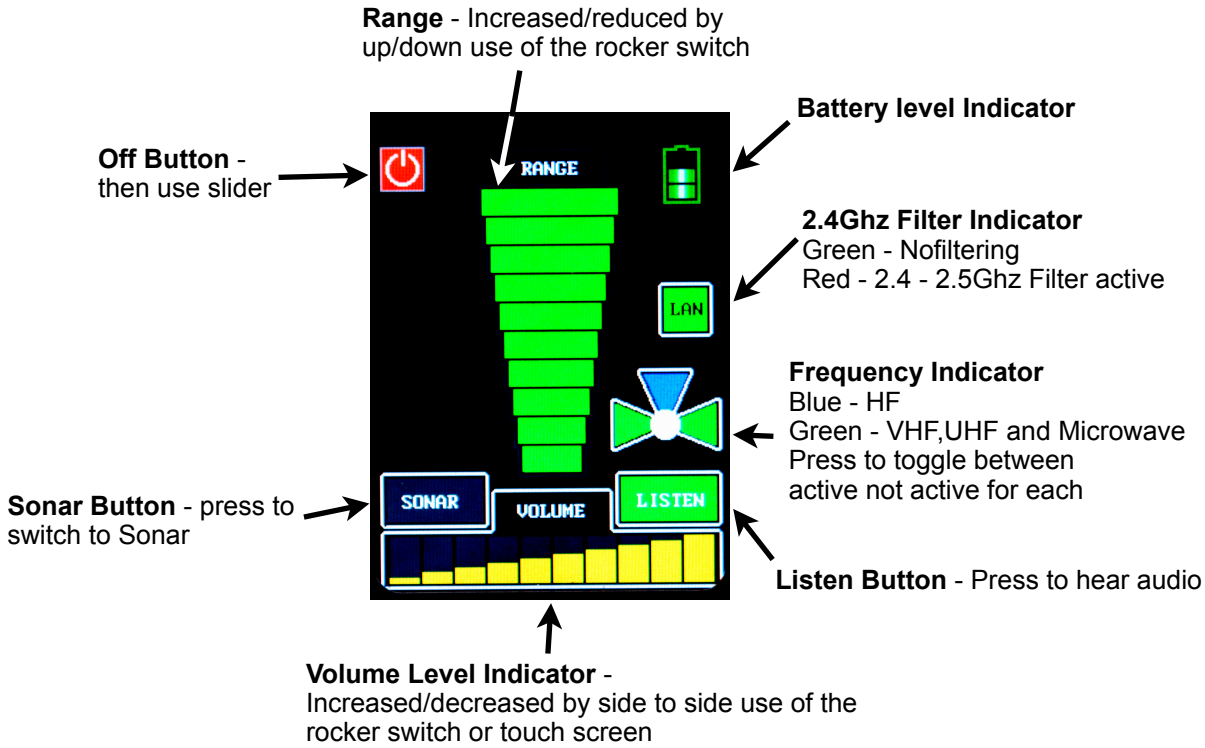
Note: Standing waves from broadcast transmitters can cause a full scale deflection of the Hunter XD metering in urban locations. These standing waves are usually notable at similar strength at a number of points in the sweep location. A full scale deflection, even if silent, noted adjacent to an object or part of a wall, at signal strength higher than is noted elsewhere in the sweep location, is almost certainly a Radio device, especially if the deflection is still full with the gain reduced by decreasing the RANGE using the touchscreen or rocker switch

4.7 Normally, Hunter XD will encounter innocent ambient signals when conducting an eavesdropper search. Innocent ambient signals will normally be noted at several points in the search location, sometimes they will be large enough to cause a full scale indication on the Barograph meter.

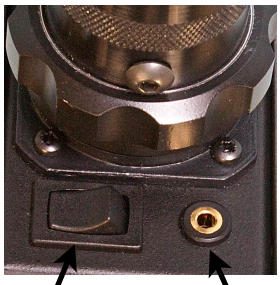
Note: Sometimes when a Radio device is detected, the headset will at first indicate increased levels of innocent ambient signals. As the Radio Microphone is approached, the true nature of the Radio device signal will be recognisable.

5. System Controls

The Hunter XD is controlled by the rocker switch and a touchscreen display


Range - Increased/reduced by up/down use of the rocker switch
Off Button - then use slider
Battery level Indicator
RANGE
2.4Ghz Filter Indicator
Green - Nofiltering
Red - 2.4 - 2.5Ghz Filter active
LAN
Frequency Indicator
Blue - HF
Green - VHF,UHF and Microwave
Press to toggle between active not active for each
Sonar Button - press to switch to Sonar
SONAR
VOLUME
LISTEN
Listen Button - Press to hear audio
Volume Level Indicator - Increased/decreased by side to side use of the rocker switch or touch screen

Range and Volume Control **Rocker Switch**



On switch - hold for 2 seconds

Headphone socket

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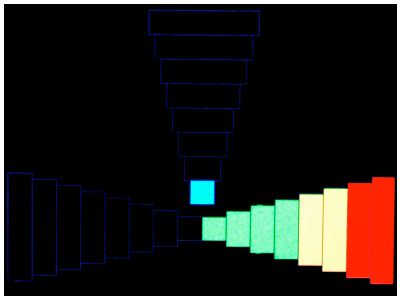
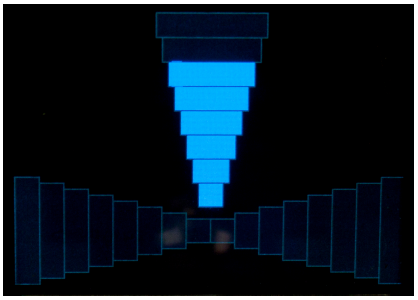
The Head-up display



This display shows detection of an UHF bug at close proximity to the right of the Antenna



This display shows detection of a HF bug at close proximity to the Antenna

5.1 Hunter XD has the following controls and switches

a) ON A momentary rocker switch, located at the front bottom of the base unit. To operate depress for two seconds.

b) OFF A touch sensitive button on the display with a slider to complete the shutdown

c) Battery Indicator shows state of battery

d) LAN indicator. Touch button. Green is normal operation. Red disables 2.4 - 2.5Ghz surveillance.

e) RANGE Indicator. Full ten increment display is maximum range.

f) Frequency Indicator. Pressing the triangular panels switches on or off HF, VHF, UHF and microwave levels of detection. The blue triangle indicates HF and the green triangles indicate VHF,UHF and microwave levels are being detected.

g) SONAR button. This touch switch operates a sonar style ping which increases in frequency when the field strength changes

h) LISTEN button. This touch switch changes the sound in the headset to that of the detected the audio of the radio transmission

i) VOLUME Indicator. More bars signify a louder volume. Self explanatory

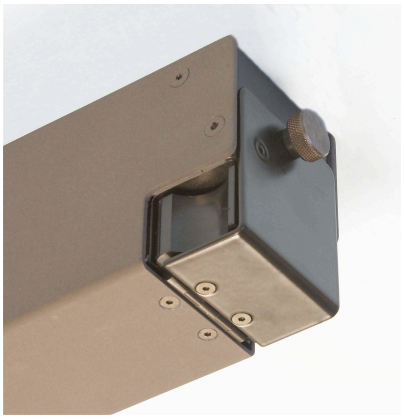
j) ROCKER switch. Up/down action controls the detection range. Left to right increases/ decreases the volume in the headset.

5.2 Battery

Important: It is imperative to operate the Hunter XD with the battery fully inserted and the battery door locked down with the thumb screw.

The battery is inserted with the LED green indicator uppermost and pushed in until seated into the connector at the back of the battery enclosure - the slight resistance can be felt. The battery will only go in fully when it is inserted the correct way up. Close the battery door and lock with the thumbscrew.

The Hunter XD will only power up when the door is closed



Note: This battery is compatible with the Locator XTS.

6. Operation

Note: ***Before the operation, make sure the battery is fully charged and the second battery is charged or on charge.***

a) Assemble the Hunter XD system, put on the headset, and turn on. Ensure sensitivity is set to maximum and adjust VOLUME to a comfortable level. MODE should be set to LISTEN.

Note: ***Putting the headset on before switching on prevents sound from the headset from reaching a eavesdropping microphone, which could alert the listening post.***

b) Perform a sweep of the target location. The Search Head of Hunter XD should be moved close to every object and surface of the test location, including the walls, floors and ceilings.

Note: ***As the Hunter XD search head is moved around the search location, sounds will be heard in the headset, and occasionally, some of the meter bars will illuminate showing the presence of field imbalance. This is quite normal, and the signals causing the imbalance will normally be easily identifiable from the sound in the headset. Should a Radio Microphone be encountered, the meter bars will deflect to full scale, and will go from full scale left to full scale right as the search head is moved by the Radio Microphone, and at the same time, the sound in the headset will change, indicating the presence of another type of transmission at this location. Do not forget the ceilings and floors, desks, and window frames.***

c) Depending on the skill of the user, it is possible to perform a sweep with Hunter XD which does not in any way alert the listening post that their Radio Microphone has been compromised. It is up to the user to decide whether to remove the device or not, but it is suggested that if the Radio Microphone has been banged by the Search Head, or if the user has been very close to the device when performing the search (the user's normal breathing sounds like thunder to the listening post in this situation) that the Radio Microphone is removed immediately.

Unless you are certain that the Radio Microphone user could not be aware that his attack has been discovered, Remove it or Loose it!

7. Inspection guidelines

7.1 Radio devices can be built into *anything*.

7.2 Radio devices can sound like *anything*.

7.3 Use both the display metering and headset with MODE set to LISTEN. The LED meter will show you that a signal is present, the headset will tell you what it is, or is not.

7.4 Use at maximum sensitivity unless the ambient field is so high that full scale meter deflection occurs frequently due to broadcast transmissions.

7.5 Hunter XD search head must be close to all surfaces and items in the sweep location. Use it like a vacuum cleaner and clear the floors, walls, ceilings, Get within 10 cm of everything.

7.6 LAN Filter. This when activated is coloured red; the frequencies 2.4 to 2.5GHz are attenuated. This band is occupied by wireless LAN (Local Area Networks) and Bluetooth devices, both common in an office environment. These genuine signals are local low power, thus similar to clandestine devices and can mask the attack.
Switching in the filter can assist the search in a busy LAN/WIFI environment but proceed with caution - some attack devices operate in this frequency band.

8. Routine Maintenance and Adjustments

8.1 The Hunter XD counter-surveillance equipment requires no routine maintenance. Should any defect be noted, the equipment should be returned to Shearwater TSCM or a locally appointed maintenance facility of Shearwater TSCM for repair.

9. Policy of Continual Improvement

9.1 Shearwater TSCM reserve the right to upgrade, improve, and modify our product line in keeping with our policy of providing our customers with the best tools possible to perform their work.

9.2 In order to provide leading edge equipment which satisfies customer needs, we appreciate feedback about our products, and through requests for changes can create better equipment more closely suited to your requirements. Your needs are our next product!

10. Specification

Frequency Range:	HF	<10Mhz - 100Mhz
	VHF, UHF, Microwave	100Mhz - 10Ghz
Battery:	Lithium Ion 7.2V. Typically 6 hours operation	
Test Source:	Wideband multiple harmonics 100-300Mhz	
Case Dimensions:	Size: 525mm x 436mm x 217mm Weight: 8 kg	

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